

AMENDMENTS TO THE CLAIMS

Claims 1-34 (Canceled)

35. (Currently amended): A method for extracting manganese from a multi-component solution, comprising:

- a) contacting the multi-component solution with a reagent to create a reaction solution, wherein the reagent comprises a quaternary ammonium compound, a hydrogen ion exchange reagent and an organic solvent (QL reagent); and
- b) removing one or more non-manganese impurities from the reaction solution to create an impurity depleted reaction solution; and
- c) extracting manganese from the impurity depleted reaction solution, wherein the pH of the solution remains constant.

36. (Currently amended) The method of claim 35, wherein the pH of the solution remains constant above 1.5.

37. (Previously Presented): The method of claim 35, wherein step (b) comprises stripping the reaction solution by contacting the reaction solution with an acid; oxidizing and precipitating one or more of the impurities in the reaction solution; and removing the oxidized and precipitated impurities from the reaction solution to create an impurity depleted reaction solution.

38. (Previously presented): The method of claim 37, wherein the acid comprises a non-oxidizing acid.

39. (Previously presented): The method of claim 37, wherein calcium is extracted from the reaction solution during the stripping step.

40. (Previously presented): The method of claim 35, wherein calcium is extracted from the multi-component solution in a further step comprising: introducing manganese-rich strip

solution to the reaction solution; displacing calcium from the reaction solution; and scrubbing the displaced calcium from the solution.

41. (Previously presented): The method of claim 40, wherein the manganese-rich strip solution contains an organic phase/aqueous phase (O/A) ratio between 5-20.

42. (Previously presented): The method of claim 35, wherein the multi-component solution comprises geothermal brine.

43. (Previously presented): The method of claim 42, wherein the geothermal brine contains zinc which is removed from the multi-component solution through a step comprising: contacting the multi-component solution with a reagent to create a mixture, wherein the reagent comprises a quaternary ammonium compound and a hydrogen ion exchange reagent; contacting the mixture with pure H₂O; and separating the zinc from the mixture.

44. (Previously presented): The method of claim 35, wherein a phase modifier is contacted with the reaction solution in step (a).

45. (Previously presented): The method of claim 35, wherein the impurity depleted reaction solution comprises manganese chloride.

46. (Previously presented): The method of claim 35, wherein in step (c) the impurity depleted reaction solution is combined with an acid to produce an electrolyte bath.

47. (Previously presented): The method of claim 46, wherein the acid is sulfuric acid or hydrochloric acid.

48. (Canceled)

49. (Currently amended): A method for extracting manganese from a composition containing an impurity, comprising:

a) contacting a composition containing manganese and one or more impurities with a QL reagent to create a reaction solution;

- b) contacting the reaction solution with an acid;
- c) oxidizing and precipitating one or more of the impurities in the reaction solution;
- d) removing the oxidized and precipitated impurities from the reaction solution to create an impurity depleted reaction solution; and
- e) applying an electric current to the impurity depleted reaction solution and removing the manganese therefrom, wherein the pH of the solution remains constant.

50. (Previously presented): The method of claim 49, wherein the QL reagent comprises a quaternary ammonium compound, a hydrogen ion exchange reagent and an organic solvent.

51. (Previously presented): The method of claim 49, wherein the acid is a non-oxidizing acid.

52. (Previously presented): The method of claim 49, wherein all components of step (a) are performed under anoxic conditions.

53. (Canceled)

54. (Currently amended): A method for extracting manganese from a multi-component solution, comprising the steps of:

- a) obtaining a zinc and calcium depleted hydrochloric acid solution containing manganese and one or more impurities;
- b) removing the one or more impurities from the solution by oxidizing the impurities, such that the impurities precipitate leaving a supernatant containing manganese chloride; and
- c) electrowinning the supernatant in a hydrochloric acid bath, such that electrolytic manganese dioxide forms a deposit, wherein the pH of the solution remains constant.